

Physics Division Seminar

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Modeling the Universe: The ExaSky Project

Host: Paul Reimer

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Cosmological observations have made rapid progress over the last three decades; multi-wavelength sky surveys covering large volumes of the Universe have cemented a cosmological "Standard Model" that has clearly identified the need for new constituents (dark matter) and new physics (dark energy). Additionally, the statistical power of the observations, combined with precision theory and modeling, now allow for cosmology-enabled fundamental measurements, such as determining the sum of neutrino masses. Next-generation surveys require a significantly improved theory and modeling effort to make accurate predictions for observables and to use these forward models for cosmological inference, a task that requires exascale computing resources. ExaSky is part of DOE's Exascale Computing Project (ECP), the largest single DOE science effort currently; within the ECP, multiple scientific research areas are targeting a qualitative jump in their scientific capability. In this talk, I will describe the aims of the ExaSky project (Argonne, LANL, LBNL) and progress made so far in getting cosmological modeling ready for the next generation of sky surveys and supercomputers.